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OKLAHOMA COOPERATIVE EXTENSION SERVICE

# Nutrition and Management Considerations for Preconditioning Home Raised Beef Calves

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Studies show that preconditioning calves at the home ranch can improve profitability during the finishing phase by $56 to $60 per head (Cravey, 1996). In this research, preconditioning included a minimum of a 45-day weaning period combined with a comprehensive vaccination, management, and nutrition program. The increased profitability for preconditioned calves was due to reduced sickness, medicine costs, labor requirements, and improved performance. In Oklahoma, a minimum of a 45-day weaning period is recommended to maximize the benefits of preconditioning (Lalman and Smith, 2001). A balanced nutrition program during this period is critical to ensure profitability for the cow/calf producer and maximum immune system function during the stressful weaning period and later production phases.

Oklahoma cattle operations vary in resources, forage species, and management systems. Consequently, one preconditioning management and nutrition program cannot be prescribed. General management considerations and several specific nutritional program options are suggested in this publication. Additionally, software decision tools are available through the OSU Animal Science web site at http://www.ansi.okstate.edu/exten/index.html. PRECON2001 estimates costs of preconditioning. It estimates returns and breakeven sale prices for cattle that will be sold. OSUNRCAF is a simple ration-balancing program designed to assist cattlemen in evaluating rations for growing calves. Both of these programs are Microsoft Excel templates, very user friendly, and free.

## Preweaning and Weaning Management

A strong immune system in beef calves begins with key management practices prior to calving. Passive transfer of colostral (first milk) immunoglobulins is vital to short-term health as well as lifetime immune function (Selk, 1995). In one experiment, calves that did not have adequate blood concentrations of immunoglobulins from the dam's colostrum within 24 hours after birth, were three times as likely to be treated for bovine respiratory disease during the feedlot phase (Wittum and Perino, 1995). Readers are referred to Selk (1995; OSU fact sheet F-3358) for a detailed discussion of factors affecting passive immunity.

Any practice that reduces stress on cattle during the first few days after weaning, reduces the risk of health problems, improves calf weight gains, and minimizes wear and tear on facilities and people. Calves should be isolated in a corral, drylot, or small grass pasture with good fencing during the ball-out period. Preferably calves should have access to the weaning area a few days prior to weaning. If a drylot or corral is used, smaller pens are preferable to reduce fence walking or pacing. Feed bunks, hay, or water troughs can be strategically placed along the fence line to discourage fence walking.

If the weaning corral is well designed and solidly constructed, the cows can stay adjacent to the calves. The corral must be constructed so that calves cannot reach through the bars to nurse. Another practice that may help is leaving the calves in a familiar weaning area and moving the cows far away so they cannot hear calves bawling. The least ideal situation is to move the cows to another pasture where they hear and see the calves, but don't have close contact. This method can work, but requires a good fence because cows will be aggressive in their efforts to get back to their calves.

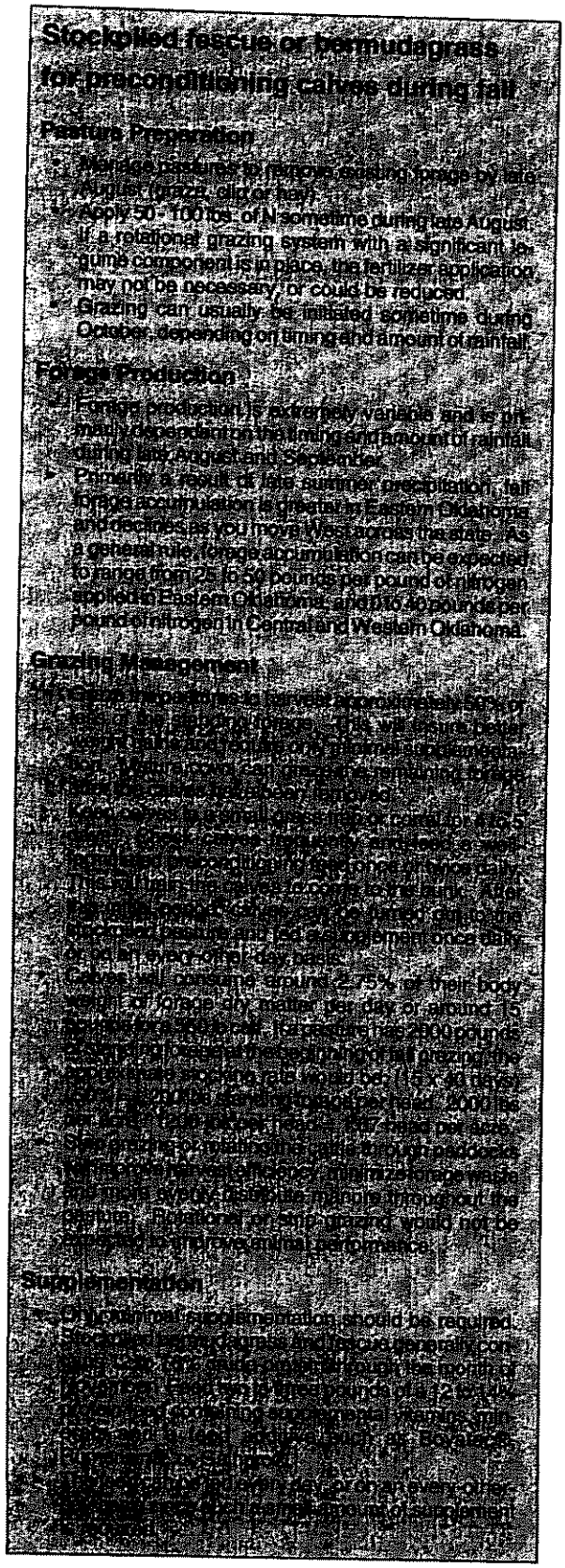
Some cattlemen leave older cows with the calves, thinking that the presence of at least one adult female will calm the calves. This practice has not improved calf health, time spent at the feed bunk, or overall performance in research settings (Gibb et al., 2000).

Another practice that seems to be growing in popularity is leaving cows and calves in adjacent pastures "nose to nose," using electric fence on either side of a barbed or woven wire fence to separate the cattle. This practice makes it easier to utilize high quality pasture rather than a dusty drylot with hay. Previous (and recent) exposure to electric fencing trains the calves to respect it. Initially, cows will graze and rest close to the fence but gradually begin to graze farther and farther away.

During the initial weaning period, a concentrate-feeding program should be implemented. This practice trains the cattle to eat from a bunk, aides in health monitoring and handling, and provides a method to incorporate supplemental nutrients in the diet.

### Deworming

Many forage systems in Oklahoma are favorable for the reproduction of internal and external parasites. In contrast to




**Supplements for calves grazing high quality pasture.** Lush green pasture, such as rye, wheat, early spring forage, or immature and growing stockpiled fescue or bermudagrass contain more protein than is required by the growing calf. Researchers at OSU have developed a supplementation program that is effective for cattle grazing this type of forage. The program is called Oklahoma Green Gold and consists of feeding approximately 2 pounds per head per day of a lower protein feed with added vitamins, minerals, and a feed additive (Table 2). This program was designed specifically with small grain, winter annual pasture in mind and should work similarly for high quality, immature perennial forages.

In four experiments with cattle grazing wheat pasture, this supplementation program improved daily weight gain by 0.42 pounds per day. Supplement conversion efficiency (compared to nonsupplemented controls) averaged 4.7 pounds of feed per pound of added weight gain.

**Table 2. Oklahoma Green Gold formula for cattle grazing high quality, lush pasture***

| *Ingredient* | *Composition, % (as fed basis)* |
|---|---|
| Ground milo | 62.15 |
| Wheat middlings | 21.0 |
| Sugarcane molasses | 5.0 |
| Limestone | 4.3 |
| Dicalcium phosphate, 21% P | 2.55 |
| Magnesium Mica (Smectite) | 4.0 |
| Fine Mixing Salt | 0.50 |
| Magnesium oxide | 0.22 |
| Vitamin and trace-mineral premix | 0.10 |
| Vitamin A-30 (30,000 IU per gram) | 0.05 |
| Feed additive | Variable |

*Source: Paisley et al., 1998. To be fed at the rate of two pounds per head per day. Can be fed on an every-other-day basis, depending on label directions of the feed additive used.

## Drylot Growing Programs

High quality pasture alternatives may not be available. In these cases, hay coupled with supplementation or concentrate-feeding programs can be implemented. The number of nutrition program alternatives is virtually unlimited.

Table 3 includes several rations for calves receiving free-choice, high quality grass hay, with a target gain between 1 to 1.7 pounds per day. Separate rations are suggested for hay containing greater than 10% protein and prairie hay, or other warm season grass hays that typically contain between 6 and 10% protein. Lower quality hay (less than 6% protein) is not recommended for preconditioning calves. The producer has the option of providing calcium and phosphorus sources (such as limestone and dicalcium phosphate), micro minerals (such as copper, zinc and selenium), vitamins A and E, and feed additives in the feed or in a free-choice mineral mix. The formulas shown in Table 3 assume that the calcium and phosphorus sources are provided in the feed mix and the other supplemental nutrients and feed additives will be provided through the mineral mix.

Alfalfa hay and corn grain are complimentary from a nutritional perspective. Good quality alfalfa hay contains high

levels of degradable protein, calcium, potassium, magnesium, and it is a good source of many of the trace minerals. Feed grains, such as milo and corn, are good sources of energy and phosphorus. If these feeds are available at reasonable prices, a growing program for calves can be centered on these commodities. A blend of 60% coarsely chopped or long stemmed alfalfa hay and 40% corn grain (cracked or whole shelled) can sustain weight gains ranging from 1.7 to 2.0 pounds per day. Alternatively, if the two ingredients cannot be blended, hay can be fed free choice or in limited amounts; and corn can be fed at 1% of body weight. Table 4 shows the amount of corn and good quality alfalfa hay required to maintain around 1.8 pounds per day gain for moderate frame steer calves ranging from 350 to 650 pounds. If a faster rate of gain is justified, up to 60% grain with 40% high quality alfalfa hay can produce efficient weight gain. As with any concentrate-feeding program, the grain portion of the ration should be introduced at two to three pounds per day and gradually increased to the desired level.

Where higher rates of gain are justified, some cattlemen prefer a ration that is delivered through a self-feeder. Self-fed rations for growing calves generally contain 60 to 80% concentrate feeds and 40 to 20% roughage products, depending on the type of roughage used. Wheat middlings, soybean hulls, and corn gluten feed are considered concentrate products, because they are rapidly digested and contain very little effective fiber.

**Table 4. Corn and alfalfa hay rations for steers gaining two pounds per day at different body weights.**

| *Weight of cattle* | *350* | *450* | *550* | *650* |
|---|---|---|---|---|
| Alfalfa hay, lb. as fed[a] | 7.5 | 8.5 | 9.5 | 10.5 |
| Whole or cracked corn, lb. as fed | 3.5 | 4.5 | 5.5 | 6.5 |

[a]Nutrient content of hay, dry matter basis; 60% TDN, 22% crude protein, 1.37% calcium, .22% phosphorus

If the roughage source is not pelleted, the factor that limits the amount included in the ration is usually the ability of the feed to flow through the feeder. On the other hand, if the roughage source is pelleted, the limiting factor is usually cost per unit of energy and (or) protein. Because these rations are highly digestible and because feed intake can be quite variable, there is always the risk of digestive upset, bloat and founder with self-fed rations. Nevertheless, weight gains of 2 to 3 pounds per day are common with feed conversions ranging from 6 to 8 pounds of feed per pound of weight gain. Obviously, feed costs, feeding facilities, fleshiness of the calves at target shipping date and available labor must all be carefully considered when evaluating whether to employ a

**Table 3. Rations for growing calves receiving free-choice high quality grass hay (% as fed).**

| | *Ration Number* | | | | | |
|---|---|---|---|---|---|---|
| *Ingredient* | *1* | *2* | *3* | *4* | *5* | *6* |
| ***High Quality Fescue, Bermudagrass, Wheat or Sudan Hay (minimum of 10% protein)*** | | | | | | |
| Commercial feed product, 12 to 14% protein | 100 | | | | | |
| Wheat middlings | | 68.0 | | | | |
| Corn or Milo | | 15.0 | 81.0 | | 39.0 | 19.5 |
| Soybean hulls | | 15.0 | | 87.0 | | 65.0 |
| Wheat | | | | | 48.0 | |
| Soybean or cottonseed meal | | | 16.0 | 10.0 | 10.0 | 13.0 |
| Limestone | | 2.0 | 2.0 | 1.0 | 2.0 | 1.0 |
| Dicalcium phosphate | | | 1.0 | 2.0 | 1.0 | 1.5 |
| Salt/mineral mix | Salt only | Free-choice | Free-choice | Free-choice | Free-choice | Free-choice |
| ***High Quality Prairie Hay (minimum of 6% protein)*** | | | | | | |
| Commercial feed product, 16 to 20% protein | 100 | | | | | |
| Wheat middlings | | 83.0 | | | | |
| Corn or Milo | | | 69.0 | | 24.0 | 23.0 |
| Soybean hulls | | | | 72.0 | | 45.0 |
| Wheat | | | | | 48.0 | |
| Soybean or cottonseed meal | | 15.0 | 28.0 | 25.0 | 25.0 | 29.0 |
| Limestone[b] | | 2.0 | 2.0 | 1.0 | 2.0 | 1.5 |
| Dicalcium phosphate[b] | | | 1.0 | 2.0 | 1.0 | 1.5 |
| Salt/mineral mix[c] | Salt only | Free-choice | Free-choice | Free-choice | Free-choice | Free-choice |

[a] Feed ration at the rate of 0.8 to 1.2% of body weight (i.e. 4 to 6 lbs to 500 lb calves).

[b] Limestone and dicalcium phosphate are sources of calcium and phosphorus. If these ingredients are not available, increase the soybean or cottonseed meal by two or three percent, according to the ration used.

[c] Vitamin A can be added to the ration to include a minimum of 5,000 international units (IU) per pound of feed, or it can be supplied through a fresh commercial salt/mineral product. A feed additive, such as Bovatec®, Rumensin®, Gainpro® or chlortetracycline should be provided through the feed or salt/mineral mix.

phases, and carcass quality begins with nutritional management of the cow before calving and continues through the entire production system. Preweaning and weaning management, postweaning nutrition, grazing programs, supplements, and mineral nutrition are all important in producing "bullet proof" calves. Each of these factors plays an important role in the efficiency and profitability of subsequent production phases.

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